

الف) $x|x| \geq 0$ $x^2 \geq 0$ $x \geq 0$ $D_f = [0, +\infty)$ $D_g = \mathbb{R}$ $D_f \neq D_g$

$f(x) = \sqrt{x^2} = |x| = x$ ($x \geq 0$) $f(x) = g(x)$

برابر نیست

ب) $\Delta = 2\Delta - 2\Delta = -1 < 0$ $\rightarrow x \in \mathbb{R}$ $D_f = \mathbb{R}$ $D_g = \mathbb{R}$ $D_f = D_g$

$(x+1)(x+1) + x + 1 = x^2 + 2x + 1 + x + 1 = x^2 + 3x + 2$

$\frac{(x+1)(x+1) + x + 1}{x^2 + 2x + 1} = 1 = g(x)$

$f(x) = g(x)$

برابر نیست

ج) $r \sin x - 1 \neq 0$ $\sin x \neq \frac{1}{r} \rightarrow D_f = \mathbb{R}$

$r \sin^2 x - 4 \sin x = r \sin x (r \sin x - 4)$

$g(x) = r \sin x$

$D_g = \mathbb{R}$

$f(x) = \frac{r \sin x (r \sin x - 4)}{r \sin x - 1} = r \sin x = g(x)$

$D_f = D_g$ $f(x) = g(x)$

برابر نیست

د) $x \neq 0$

$D_f = D_g = \mathbb{R} - \{0\}$

$f(x) = \frac{x}{x} = 1$

$f(x) = \frac{x}{-x} = -1$

$g(x) = \frac{x}{x} = 1$

$g(x) = \frac{-x}{x} = -1$

$x > 0 \rightarrow |x| = x$

$f(x) = g(x) \begin{cases} 1 & x > 0 \\ -1 & x < 0 \end{cases}$

برابر نیست

ه) $x^2 + 1 > 0$ $D_f = \mathbb{R}$

$D_f = D_g = \mathbb{R}$

$x^2 + 1 > 0 \rightarrow x^2 > -1$

$0 \leq \frac{x^2}{x^2 + 1} < 1$

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$x - [x] \in [0, 1)$ $D_g = \mathbb{R}$

$f(x) = g(x) = 0$

$x^2 + 1 > x^2$

$f(x) = 0$

$0 \leq [x - [x]] < 1$

$g(x) = 0$

برابر نیست

و) $[rx] \neq 0$

$0 \leq rx < 1 \rightarrow 0 \leq x < \frac{1}{r}$ $D_f = \mathbb{R} - [0, \frac{1}{r})$

$D_f \neq D_g$

$r[x] \neq 0$ $0 \leq x < 1$

$D_g = \mathbb{R} - [0, 1)$

برابر نیست

ز) $x - |x| > 0$ $x > 0 \rightarrow |x| = x \rightarrow x - |x| = x - x = 0$ x

$x < 0 \rightarrow |x| = -x \rightarrow x - (-x) = 2x > 0 \rightarrow x > 0$ غیر ممکن

$D_f = \emptyset$

$|x| - x > 0$ $x > 0 \rightarrow |x| = x \rightarrow x - x = 0 \rightarrow x > 0$ x

$x < 0 \rightarrow |x| = -x \rightarrow -x - x = -2x > 0 \rightarrow x < 0$ $\checkmark$

$D_g = (-\infty, 0)$

$D_f \neq D_g$

برابر نیست

ح) $x - 1 \neq 0$ $x \neq 1$

$g(x) = r$ $x \neq 1$

$\frac{x^3 - x}{x - 1} = \frac{x(x+1)(x-1)}{x-1} = x^2 + x$

$D_f = \mathbb{R} - \{1\}$

$D_g = \mathbb{R}$

$x^2 + x = r$

$x^2 + x - r = 0$

$(x+2)(x-1) = 0$

$x = -2$ $x = 1$

$D_f \neq D_g$

$f(x) = g(x) \rightarrow x = -2$ $\checkmark$

$D_f = \mathbb{R}$

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برابر نیست

$(f+g) + (f-g) = (x^2 + x + 1) + (x^2 - x + 1) \rightarrow 2f(x) = 2x^2 + 2 \rightarrow f(x) = x^2 + 1$

$f(x) + g(x) = (x^2 + 1) + g(x) \rightarrow g(x) = x$

$f'(x) = (f(x))' = (x^2 + 1)' = 2x + 2x^2 + 1$

$g'(x) = (g(x))' = x'$

$f'(x) + g'(x) = 2x^2 + 2x + 1 + x = 2x^2 + 3x + 1$

$x^2 - r \geq 0$ $x^2 \geq r$ $x \leq -\sqrt{r}$ $x \geq \sqrt{r}$ $D_f \cap D_g = (-\infty, -\sqrt{r}] \cup [\sqrt{r}, +\infty)$

$f \times g$

شکل؟ تابع

$x^2 - mx + n = k(r x^2 - r x - a)$

$x^2 - mx + n = r k x^2 - r k x - a k$

$1 = r k$ $k = \frac{1}{r}$

x^2 ضریب

(1)

$ax + r = k(x - b)$

$\frac{1}{r}(x - b) \xrightarrow{x \text{ ضریب}} a = \frac{1}{r}$

$r = -\frac{b}{r} \rightarrow b = -r$

$-m = -r k = -\frac{r}{r}$ $m = \frac{r}{r}$ x ضریب

$n = -a k = -\frac{a}{r}$ x ضریب

$am - bn = (\frac{1}{r} \times \frac{r}{r}) - ((-r) \times (-\frac{a}{r})) = \frac{1}{r} - 1 = -\frac{r-1}{r}$

$$\frac{bx+r}{\lambda x+b} = c \quad \lambda x+b \neq 0 \quad x \neq -\frac{b}{\lambda} \quad bx+r = \lambda cx + bx \quad b = \lambda c \rightarrow b = \lambda c = \lambda x \frac{r}{b} \quad b^2 = 14 \quad b = \pm \sqrt{14}$$

$$r = bc \rightarrow c = \frac{r}{b} \quad b = \sqrt{14} \rightarrow c = \frac{r}{\sqrt{14}} = \frac{1}{\sqrt{14}}$$

$$b = -\sqrt{14} \rightarrow c = \frac{r}{-\sqrt{14}} = -\frac{1}{\sqrt{14}}$$

$$a = -\frac{b}{\lambda} \quad \text{استخرج من المعادلة}$$

$$\frac{ab}{c} = \frac{(-\frac{b}{\lambda}) \times b}{c} = \frac{-b^2}{\lambda c \frac{r}{b}} = \frac{-b^2}{\frac{14}{b}} = \frac{-b^3}{14}$$

$$\frac{ab}{c} = \frac{-14}{14} = -1 \quad \frac{ab}{c} = \frac{-(-14)}{14} = 1$$

$$f = \{(-1, 2), (2, 4), (3, -2), (0, \frac{1}{2})\}$$

$$g = \{(2, 1), (3, 12), (-1, -1), (0, 0)\}$$

$$f+g = \{(-1, 1), (2, 5), (3, 10), (0, \frac{1}{2})\}$$

$$fg = \{(2, 1)(3, 12)(-1, -1)(0, 0)\} = \{(2, 1)(3, 12)(-1, -1)\}$$

$$x: 1, 2, 3$$

$$a = d = -1$$

$$3a - 2b = 1 \rightarrow -3 - 2b = 1 \rightarrow -2b = 4 \rightarrow 2b = -4 \rightarrow b = -2$$

$$a - 3b = c \rightarrow -1 - (-6) = 5 \quad d + c = -1 + 5 = 4$$

$$-x^2 + x - m \geq 0 \quad \Delta = 1 - 4m$$

$$\Delta = 0 \quad 1 - 4m = 0 \rightarrow 4m = 1 \rightarrow m = \frac{1}{4}$$

$$-x^2 + x + \frac{1}{4} \quad x = \frac{-b}{2a} = \frac{-1}{-2} = \frac{1}{2} \quad f(\frac{1}{2}) = \sqrt{0} = 0$$

$$g(x) = \{(a, b)\} \rightarrow \{(\frac{1}{2}, 0)\} \quad a+b = \frac{1}{2}$$

$$(2x+a)(x-c) = 2(x^2+4x+b)$$

$$2x^2+14x+2b$$

$$(2x+a)(x-c) = 2x(x-c) + a(x-c) = 2x^2 - 2xc + ax - ac = 2x^2 + (a-2c)x - ac$$

$$a-2c = 14 \quad a = 14+2c \quad -ac = 2b \quad b = \frac{-ac}{2} = \frac{-(14+2c)c}{2}$$

$$a+b+c = (14+2c) - \frac{14c-2c^2}{2} + c = 14 + 2c - 7c + c^2 + c = 14 - 4c + c^2$$